

What is claimed is:

1. A method for designing a surgical guide for a joint replacement prosthesis comprising:

generating a bone surface image from three dimensional bone image data of a patient's bone;

generating a surgical guide image from the bone surface image and an image of a prosthetic implant imposed on the bone surface image; and

generating control data from the surgical guide image so that the control data may be used to control operation of a machine to fabricate a surgical guide.
2. The method of claim 1, wherein the bone surface image is formed from computed tomography data of the patient's bone.
3. The method of claim 1, wherein the surgical guide image generation includes integrating at least one marker slot in the surgical guide image.
4. The method of claim 1 further comprising:

controlling a laser with the control data to selectively crystallize a resin to form a surgical guide that corresponds to the surgical guide image.
5. The method of claim 1 further comprising:

controlling a machine tool with the control data to selectively cut a solid material to form a surgical guide that corresponds to the surgical guide

image.

6. The method of claim 1 wherein the control data generation includes:

generating stereolithography data from the surgical guide image.

7. The method of claim 1 wherein the control data generation includes:

generating machine tool control data from the surgical guide image.

8. A system for designing a surgical guide for a joint replacement prosthesis comprising:

a bone surface image generator for forming a bone surface image from three dimensional bone anatomical data for a patient's bone;

a surgical guide image generator for generating a surgical guide image from the bone surface image and an image of a prosthesis implant imposed on the bone surface image; and

a surgical guide image converter for generating control data to control operation of a machine for fabricating a surgical guide that corresponds to the surgical guide image.

9. The system of claim 8, wherein the bone surface image generator generates a bone surface image from computed tomography data of a patient's bone.

10. The system of claim 8, wherein the surgical guide image

generator integrates at least one marker slot in the surgical guide image.

11. The system of claim 8 wherein the control data generator generates stereolithography data for controlling a laser to selectively crystallize a resin to form the surgical guide.

12. The system of claim 8 wherein the control data generator generates computerized numerical control data for controlling a cutting tool to selectively cut a solid material to form the surgical guide.

13. The system of claim 8 wherein the surgical guide image generator generates the surgical guide image from a bone surface image of an acetabulum bone and an image of an acetabular cup.

14. The system of claim 8 wherein the surgical guide image generator generates the surgical guide image from a bone surface image of a femur bone and an image of a femoral stem.

15. A system for aiding a surgeon in a joint replacement operation comprising:

- a patient bone data repository for storing three dimensional data of a patient's bone;

- a reference pointer for providing positional data;

- a registration module for receiving the positional data and correlating the positional data to the three dimensional data for the bone;
- and

an image generator for generating an image of the patient's bone.

16. The system of claim 15 wherein the image generator imposes an image of a prosthetic implant on the generated image of the patient's bone.

17. The system of claim 15 wherein the image generator generates the image in an orientation that corresponds to the angular orientation of the reference pointer with respect to a position on the bone.

18. The system of claim 15 wherein the reference pointer is an articulating arm with positional gyros mounted at pivotal joints of the articulating arm.

19. The system of claim 15 wherein the reference pointer communicates wirelessly with the registration module.

20. The system of claim 16 wherein the image generator generates an image of an acetabular cup on an image of a patient's acetabulum bone.